

Trend Study 19B-5-02

Study site name: West Government Creek.

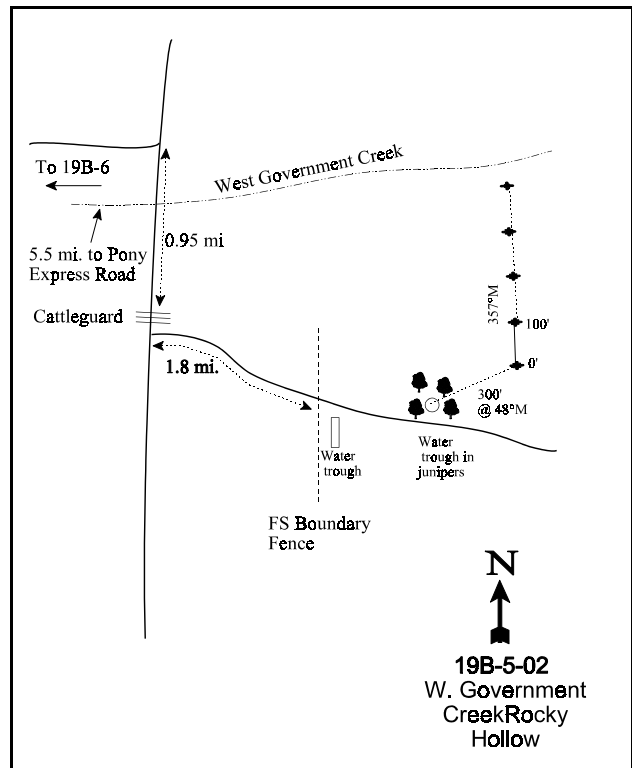
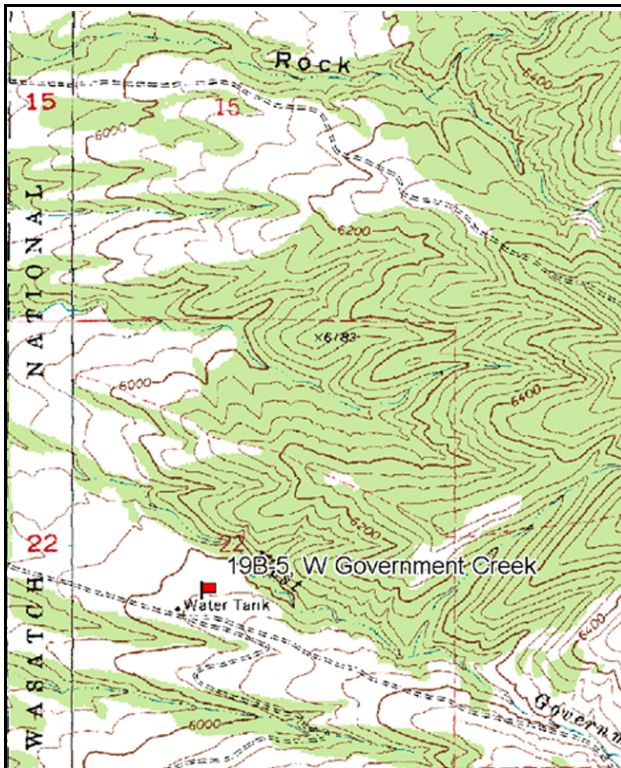
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 357 degrees magnetic.

Frequency belt placement: line 1 (11& 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Turn south off the Pony Express Road onto the Erickson Pass Road. Go 4.6 miles to the turnoff to study 19B-6. Continue 0.95 miles to a cattleguard. Turn left 60 yards past the cattleguard. Go 1.8 miles to a water trough. From the northeast side of the circular trough, the 0-foot baseline stake is 300 feet away at an azimuth of 48 degrees. This stake is marked by browse tag #3975.



Map Name: Lookout Pass

Diagrammatic Sketch

Township 9S, Range 7W, Section 22

GPS: NAD 27, UTM 12S 4430789 N 361786 E

DISCUSSION

West Government Creek - Trend Study No. 19B-5

The West Government Creek study samples deer winter range on Forest Service administered land. The site has a 7-10% slope and a west to northwest aspect. The range type is Wyoming big sagebrush-grass, but this area was formerly occupied by juniper-pinyon woodland. In the late 1960's, the trees were chained and windrowed. The area was then seeded using a rangeland drill. Remnant tree windrows and drill rows are still partially visible, but are being concealed by a thick canopy cover of Wyoming big sagebrush. In 1983, it was noted that heavy cattle use was depressing grass vigor. Past intense cattle grazing has in part help to contribute to the high Wyoming big sagebrush canopy cover. Scattered pinyon and juniper trees are present but it does not appear that they will become a problem reoccupying the site in the near future. Juniper density was estimated at only 30 trees/acre from point-center quarter data in 2002. Use of the site by big game is very light. A pellet group transect read on site in 2002 estimated 14 deer days use/acre (35 ddu/ha) and no elk pellet groups were sampled. Cattle use was estimated at 33 days use/acre (82 cdu/ha). Rabbit droppings were also moderately abundant.

Soil is alluvial with a gravelly texture. The soil profile, judging from nearby road and stream cuts, appears relatively unconsolidated. Textural and chemical analysis indicates a loam with a slightly alkaline reactivity (pH of 7.6). Effective rooting depth was estimated at 12 inches with an average soil temperature of 59°F at 14 inches in depth. Surface soil movement and pedestalling around plants has been apparent on the site. Percent bare ground was initially very high at 51% in 1983. Bare soil declined to more moderate levels in both 1989 and 1997, but with drought in 2002, again increased bare soil to 40%. The erosion condition class was determined as slight in 2002.

Wyoming big sagebrush is the key browse which dominates the site with an estimated density of 3,160 plants/acre in 2002. In 1983 and 1989, this shrub was identified as basin big sagebrush (*Artemisia tridentata tridentata*), but further scrutiny in 1997 revealed it as actually Wyoming big sagebrush (*Artemisia tridentata wyomingensis*). From 1983-1997, percent decadence was low, vigor generally normal, with very few dead in the population. Decadence increased to 24% in 2002, but with drought, this is not excessive for Wyoming big sagebrush. Mature plants have made up anywhere from two-thirds to three-fourths of the population in all readings. Recruitment by young plants was moderate to high during the first three readings, but declined considerably in 2002. Utilization has been light to moderate in all years. Canopy cover of Wyoming big sagebrush was estimated at 31% in 2002. It will be difficult for the herbaceous understory to remain healthy and productive with sagebrush canopy at this level. Annual sagebrush leader growth averaged just over one inch of growth in 2002. Antelope bitterbrush provides additional, but limited forage. Density was estimated at about 100 plants/acre in 1997 and 2002. These plants have a prostrate growth form due to heavy browsing over the years. Even with heavy use, bitterbrush plants show normal vigor and no decadent plants were sampled in 1997 or 2002.

The grass component is composed primarily of three species, crested wheatgrass, intermediate wheatgrass, and Sandberg bluegrass. Crested wheatgrass has been the most abundant grass providing nearly one-half of the grass cover in 1997 and 2002. Nested frequency of crested wheatgrass and Sandberg bluegrass were identical in 2002 after crested wheatgrass significantly declined. Intermediate wheatgrass remained stable in nested frequency in 2002, and is more common in the depressions throughout the area. Cheatgrass brome was sampled in 1997 and 2002, but was found in only a few quadrats. Sum of nested frequency for all perennial grasses combined has remained similar over all readings.

Forb diversity and abundance has been fair. The most abundant perennials include silky milkvetch, tapertip hawksbeard, alfalfa, American vetch, and longleaf phlox. Perennial forb sum of nested frequency increased between 1983 and 1989, and remained stable in 1997. With drought in 2002, most of the forbs on the site did not appear or remained dormant as sum of nested frequency declined by 92%. Only three forb species were sampled in low abundances in 2002, pale agoseris, rock goldenrod, and American vetch. Annual forbs were abundant in 1997, but none were sampled in 2002 with drought. The most common species were pale alyssum and bur buttercup. Forbs should rebound with better precipitation in the future.

1983 APPARENT TREND ASSESSMENT

Soil trend appears stable, but only due to the flat terrain. On nearby steeper slopes, considerable soil movement is apparent. Wyoming big sagebrush does not appear to be increasing and exhibits good vigor, resulting in an apparent stable browse trend. The herbaceous understory trend also looks stable with a moderately diverse understory.

1989 TREND ASSESSMENT

Although some soil loss appears to have occurred, the soil trend is slightly up with more protective ground cover from vegetation and litter with less bare soil. The browse trend is up. Young sagebrush make up 26% of the population, as density increased significantly. Decadence is low, while use is mostly light. Although the herbaceous understory is depleted, the sum of nested frequency for both perennial grasses and forbs increased. This leads to a slightly upward herbaceous understory trend.

TREND ASSESSMENT

soil - slightly up (4)

browse - up (5)

herbaceous understory - slightly up (4)

1997 TREND ASSESSMENT

The soil trend is slightly upward with a decrease in percent bare ground with a corresponding increase in litter and vegetative cover. Soil erosion is minimal at this time. The browse trend is stable with similar age structure in the Wyoming big sagebrush population. Density declined from an estimated 5,298 plants/acre to 2,300 plants/acre, but this is primarily due to the greatly increased sample size as there were no dead plants sampled. The larger sample used in 1997 better estimates shrub densities. Canopy cover may be slightly high at this time which could be negatively affecting the herbaceous understory production. The herbaceous understory trend is stable. Perennial herbaceous understory sum of nested frequency has slightly increased since 1989 and provides adequate protection against erosion.

TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soil is down. Drought conditions in 2002 resulted in an increase in bare ground from 16% to 40%, and decreases in both litter and vegetation cover. Although the erosion index is rated as only slight, erosion is apparent at the present time. Trend for browse is stable. Sagebrush decadence increased, but considering the drought, the current level of 24% is not excessive. Use remains light to moderate. Vigor is generally good throughout the population. Trend for the herbaceous understory is down. Perennial grasses slightly declined in sum of nested frequency, while perennial forbs drastically declined. Drought, crickets, and a high canopy cover of Wyoming big sagebrush are combining to depress the understory on this site. This area would be a good candidate for some type of treatment to thin the canopy of sagebrush and promote an increase in the herbaceous understory.

TREND ASSESSMENT

soil - down (1)

browse - stable (3)

herbaceous understory - down (1)

HERBACEOUS TRENDS --
Herd unit 19B, Study no: 5

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron cristatum	c279	bc263	b231	a176	94	96	85	64	8.53	5.74
G	Agropyron intermedium	bc154	c192	ab136	a132	69	78	50	49	3.59	3.02
G	Agropyron spicatum	-	-	7	9	-	-	2	6	.18	.39
G	Bromus tectorum (a)	-	-	12	3	-	-	5	1	.02	.00
G	Oryzopsis hymenoides	1	-	-	-	1	-	-	-	-	-
G	Poa secunda	a39	a50	b168	b176	18	24	70	67	3.95	2.73
G	Sitanion hystrix	3	-	-	4	1	-	-	2	-	.03
Total for Annual Grasses		0	0	12	3	0	0	5	1	0.02	0.00
Total for Perennial Grasses		476	505	542	497	183	198	207	188	16.26	11.93
Total for Grasses		476	505	554	500	183	198	212	189	16.29	11.93
F	Agoseris glauca	-	-	2	3	-	-	1	1	.00	.00
F	Alyssum alyssoides (a)	-	-	b249	a-	-	-	87	-	.63	-
F	Antennaria rosea	-	8	3	-	-	5	1	-	.00	-
F	Arabis spp.	-	-	6	-	-	-	3	-	.01	-
F	Astragalus cibarius	b25	c74	b25	a-	12	32	11	-	1.14	-
F	Astragalus convallarius	3	6	3	-	1	4	3	-	.04	-
F	Castilleja chromosa	-	2	1	-	-	1	1	-	.03	-
F	Calochortus nuttallii	1	-	1	-	1	-	1	-	.00	-
F	Chaenactis douglasii	b16	ab9	ab3	a-	6	3	1	-	.00	-
F	Cirsium neomexicanum	1	6	2	-	1	3	2	-	.03	-
F	Comandra pallida	-	-	3	-	-	-	1	-	.03	-
F	Collinsia parviflora (a)	-	-	b45	a-	-	-	21	-	.11	-
F	Crepis acuminata	b14	b26	b15	a-	6	13	7	-	.16	-
F	Cymopterus longipes	b11	c31	ab10	a-	6	18	4	-	.04	-
F	Eriogonum spp.	-	-	1	-	-	-	1	-	.03	-
F	Erigeron pumilus	b16	b16	ab9	a-	10	11	4	-	.02	-
F	Galium boreale	-	-	4	-	-	-	3	-	.18	-
F	Lathyrus brachycalyx	a-	a-	b34	a-	-	-	15	-	.37	-
F	Medicago sativa	b18	c38	b13	a-	12	17	7	-	1.72	-
F	Microsteris gracilis (a)	-	-	b23	a-	-	-	8	-	.04	-
F	Petradoria pumila	bc30	c37	ab18	a12	17	17	10	7	.34	.28
F	Phlox longifolia	b55	b69	b68	a-	26	31	30	-	.66	-
F	Ranunculus testiculatus (a)	-	-	b200	a-	-	-	67	-	1.00	-
F	Tragopogon dubius	-	2	-	-	-	1	-	-	-	-
F	Vicia americana	b4	a-	c89	b10	3	-	40	4	.57	.04

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
	Total for Annual Forbs	0	0	517	0	0	0	183	0	1.78	0
	Total for Perennial Forbs	194	324	310	25	101	156	146	12	5.43	0.33
	Total for Forbs	194	324	827	25	101	156	329	12	7.21	0.33

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Herd unit 19B, Study no: 5

T y p e	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	<i>Artemisia tridentata wyomingensis</i>	73	76	17.67	20.67
B	<i>Atriplex canescens</i>	0	0	-	.38
B	<i>Gutierrezia sarothrae</i>	10	10	.03	.12
B	<i>Juniperus osteosperma</i>	1	3	.85	1.37
B	<i>Purshia tridentata</i>	5	4	.71	.38
	Total for Browse	89	93	19.27	22.94

CANOPY COVER -- LINE INTERCEPT

Herd unit 19B, Study no: 5

Species	Percent Cover	
	'97	'02
<i>Artemisia tridentata wyomingensis</i>	-	31.33
<i>Gutierrezia sarothrae</i>	-	.07
<i>Juniperus osteosperma</i>	-	2.25
<i>Purshia tridentata</i>	-	.05

Key Browse Annual Leader Growth

Herd unit 19B , Study no: 5

Species	Average leader growth (in)
	'02
<i>Artemisia tridentata wyomingensis</i>	1.2

Point-Quarter Tree Data

Herd unit 19B , Study no: 5

Species	Trees per Acre		Average diameter (in)	
	'97	'02	'97	'02
<i>Juniperus osteosperma</i>	24	30	4.6	4.1

BASIC COVER --

Herd unit 19B, Study no: 5

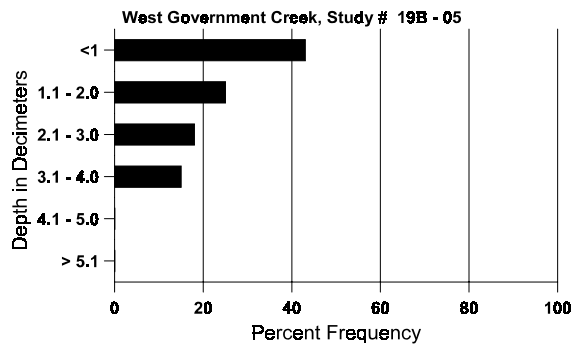
Cover Type	Nested Frequency		Average Cover %			
	'97	'02	'83	'89	'97	'02
Vegetation	361	317	5.25	10.00	42.08	35.67
Rock	134	129	2.75	2.75	.76	1.08
Pavement	254	263	8.75	22.50	6.08	5.15
Litter	388	378	32.25	38.75	42.22	37.11
Cryptogams	190	39	0	0	4.57	1.06
Bare Ground	240	296	51.00	26.00	16.29	40.34

SOIL ANALYSIS DATA --

Herd Unit 19B, Study no: 5, West Government Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.2	58.5 (14.0)	7.6	40.4	35.1	24.6	3.4	23.8	336.0	0.2

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 19B, Study no: 5

Type	Quadrat Frequency		Pellet Transect	
	'97	'02	Pellet Groups per Acre 02	Days Use per Acre (ha) 02
Rabbit	21	12	-	-
Deer	3	3	183	14 (35)
Cattle	10	10	400	33 (82)

BROWSE CHARACTERISTICS --

Herd unit 19B, Study no: 5

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata wyomingensis																		
S	83	35	-	-	-	-	-	-	-	-	35	-	-	-	1166		35	
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33		1	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	83	21	8	-	-	-	-	-	-	-	29	-	-	-	966		29	
	89	36	5	-	-	-	-	-	-	-	35	-	6	-	1366		41	
	97	12	6	-	-	-	-	-	-	-	17	1	-	-	360		18	
	02	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
M	83	21	42	-	-	-	-	-	-	-	63	-	-	-	2100	25 36	63	
	89	82	22	-	-	-	-	-	-	-	101	2	1	-	3466	21 24	104	
	97	48	37	-	-	2	-	-	-	-	78	4	5	-	1740	31 51	87	
	02	81	30	1	3	-	-	-	-	-	115	-	-	-	2300	30 47	115	
D	83	-	1	-	-	-	-	-	-	-	-	-	1	-	33		1	
	89	14	-	-	-	-	-	-	-	-	9	1	2	2	466		14	
	97	8	1	-	1	-	-	-	-	-	6	2	-	2	200		10	
	02	18	17	3	-	-	-	-	-	-	28	1	-	9	760		38	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		55%			00%			01%			+42%							
'89		17%			00%			07%			-57%							
'97		40%			00%			06%			+27%							
'02		30%			03%			06%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	3099	Dec:	1%			
												'89	5298		9%			
												'97	2300		9%			
												'02	3160		24%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	3	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
	02	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	89	1	-	-	-	-	-	-	-	-	-	-	-	-	33	7	4	
	97	9	-	-	-	-	-	-	-	-	-	-	-	-	180	12	11	
	02	20	-	-	-	-	-	-	-	-	-	-	-	-	400	7	9	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'89		00%			00%			00%			+86%							
'97		00%			00%			00%			+45%							
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	0%			
												'89	33		0%			
												'97	240		0%			
												'02	440		5%			
Juniperus osteosperma																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	02	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	02	1	-	-	-	-	-	1	-	-	-	-	-	-	40	-	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%										
'89		00%			00%			00%										
'97		00%			00%			00%			+67%							
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	20		-			
												'02	60		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Purshia tridentata																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	83	-	-	2	-	-	-	-	-	-	2	-	-	-	66	9 28	2	
	89	-	-	1	-	1	-	-	-	-	2	-	-	-	66	12 22	2	
	97	-	-	2	1	1	-	-	-	-	4	-	-	-	80	15 38	4	
	02	-	-	5	-	-	-	-	-	-	5	-	-	-	100	17 51	5	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	1	-	-	1	-	-	-	2	-	-	-	66		2	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			100%			00%			+50%							
'89		25%			75%			00%			-24%							
'97		20%			40%			00%			+17%							
'02		00%			83%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	66	Dec:	0%			
												'89	132		50%			
												'97	100		0%			
												'02	120		0%			